

further recites the formation of a first groove penetrating through at least some of the plurality of layers. The first groove is then etched along a specified layer to form a pair of second grooves. The second grooves are filled up with a material having a refractive index higher than that of the specified layer.

Applicant submits that Karapiperis fails to disclose the above features. As taught by Karapiperis, second grooves 57, 77 are etched along specified layer 53, 73 in first groove 56, 76 (Fig. 5C; col. 9, lines 16-29; Fig. 6A; col. 12, line 66-col. 13, line 2). First groove 56, 76 and second grooves 57, 77 are then filled with material 58, 78 (Fig. 5D; col. 9, lines 29-34; Fig. 6B; col. 13, lines 3-7). However, second grooves 57, 77 are not filled with a material having a higher refractive index than specified layer 53, 73. Rather, specified layer 53, 73 has a higher refractive index than material 58, 78. For example, specified layer 53, 73 is made of an amorphous silicon, and material 58, 78 comprises a monocrystalline GaAs (col. 8, line 67; col. 9, line 33; col. 12, line 41; col. 13, line 6). Applicant submits that amorphous silicon has a higher refractive index than monocrystalline GaAs.

Accordingly, since Karapiperis fails to teach or disclose that second grooves 57, 77 are filled with a material having a higher index of refraction than specified layer 53, 73, Applicant submits that claim 1 is patentable over the cited reference.

Since claim 2 contains features which are analogous to the features recited in claim 1, Applicant submits that claim 2 is patentable for at least similar reasons as set forth above.

Turning to claim 3, Applicant submits that the cited reference fails to teach or suggest every limitation of the claim. For example, claim 3 recites that a layer made of a different

material from that having the high refractive index is formed so as to contact with a surface portion of the first groove. As stated previously, the entire first groove 56, 76 of Karapiperis is filled with material 58, 78 (monocrystalline GaAs) (Fig. 5D; col. 9, lines 29-34; Fig. 6B; col. 13, lines 3-7). In other words, material 58, 78 contacts the entire surface portion of first groove 56, 76. Layer 59, 79 is then formed on top of material 58, 78 (Fig. 5E; col. 9, lines 34-37; Fig. 6B; col. 13, lines 8-11). Such configuration fails to teach or suggest that a layer made of a material, which is different than material 58, 78, contacts a surface portion of the first groove 56, 76, as required by claim 3. Accordingly, Applicant submits that claim 3 is patentable over the cited reference.

In regards to claim 4, Applicant submits that the cited reference fails to teach or suggest every limitation of the claim. For example, claim 4 recites that a first groove is formed by penetrating through a plurality of layers to a specified layer. A pair of second grooves are then formed in the specified layer. The Examiner maintains that Karapiperis discloses the claimed first groove, however, Applicant believes the Examiner is misinterpreting and/or misapplying the cited reference.

For example, as shown in Figures 5C and 6A of Karapiperis, the second grooves 57, 77 are formed in specified layer 53, 73. However, as further shown in Figure 5C and 6A, the first groove 56, 76 is not formed “to” the specified layer 53, 73. Rather, first groove 56, 76 is formed past specified layer 53, 73 to substrate 50, 70 (col. 9, lines 16-18; col. 12, lines 58-60).

Therefore, first groove 56, 76 fails to meet the claimed first groove.

In addition, claim 4 recites that the layers which are exposed by the first groove are laminated with a material having a refractive index which is lower than the refractive index of the material which fills the second grooves. Applicant submits that Karapiperis fails to teach or suggest such a feature since the same material (material 58, 78) which fills first groove 56, 76, also fills second grooves 57, 77 (Figs. 5C, 5D, 6B). Therefore, the reference fails to suggest that the exposed layers (51, 52, 54; 71, 72, 74) in the first groove 56, 76 are laminated with a material having a lower refractive index than the material used to fill the second grooves 57, 77. Accordingly, Applicant submits that claim 4 is patentable over the cited reference.

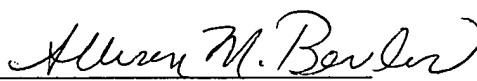
Since claim 5 is dependent upon claim 4, Applicant submits that such claim is patentable at least by virtue of its dependency.

In view of the above, reconsideration and allowance of this application are now believed to be in order, and such actions are hereby solicited. If any points remain in issue which the Examiner feels may be best resolved through a personal or telephone interview, the Examiner is kindly requested to contact the undersigned at the telephone number listed below.

The USPTO is directed and authorized to charge all required fees, except for the Issue Fee and the Publication Fee, to Deposit Account No. 19-4880. Please also credit any overpayments to said Deposit Account.

Respectfully submitted,

SUGHRUE MION, PLLC
Telephone: (202) 293-7060
Facsimile: (202) 293-7860


Allison M. Bowles
Registration No. 48,294
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